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Surveillance

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Annual Report for

**Idaho
National
Engineering
Laboratory**

1993



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Foreword

The U.S. Department of Energy (DOE) is committed to assuring the health and safety of its workers through the development of epidemiologic surveillance activities. A pilot epidemiologic surveillance program has been implemented at selected DOE sites during the past several years. This approach has been expanded to include surveillance of all medical conditions that result in an absence of 5 or more consecutive workdays and deaths among active employees. This annual epidemiologic surveillance report provides the final summary for the Idaho National Engineering Laboratory for the 12-month period, January 1, 1993, through December 31, 1993.

Caution is required when comparing this information with that of other DOE facilities. Interpretation of these data must take into account the occupational medicine program, health and safety practices, the composition of the work force, and potential occupational exposures unique to this facility; therefore, the data presented are pertinent only to the Idaho National Engineering Laboratory. Continuing surveillance and data examination may suggest emerging trends that change the preliminary interpretation of the data.

Plans for future annual reports include a discussion of important new findings and changes occurring since previous reports and the incorporation of information from the National Center for Health Statistics and the National Cancer Institute's Surveillance, Epidemiology, and End Results Program. This information

will allow early recognition and investigation of possible work-related problems, as well as an analysis of trends over time. In addition, the results of epidemiologic surveillance will be combined with those of medical and exposure surveillance to form an integrated approach to worker health protection.

INEL at a Glance

- This report marks the first annual epidemiologic surveillance report for the Idaho National Engineering Laboratory.
- About 9% of the INEL work force reported at least one absence of 5 or more days due to illness or injury during 1993.
- Respiratory diseases reflected the highest diagnosis rate for both men and women.
- Diagnosis rates for reported injuries ranked second for men but fifth for women at INEL; external injuries accounted for 20% of all diagnoses among men and about 10% of the total diagnoses among women (12% excluding pregnancy and childbirth-related diagnoses.)
- Overall, rates of reported diagnoses were about 83% higher for hourly than for salaried workers. Diagnosis rates were consistently higher among hourly occupational groups, suggesting underreporting of health events by salaried workers.
- Craftsmen and service workers had higher relative risks of reported disease and injury than did administrative, technical, and professional occupational groups. Administrative and professional staff were at significantly reduced risk for reported disease and injury, suggesting that the difference may be due to differences in compliance with reporting requirements between workers in hourly versus salaried occupations.
- Data on OSHA-recordable injuries and illnesses were not available for 1993.

Introduction

Epidemiologic surveillance at DOE facilities consists of regular and systematic collection, analysis, and interpretation of data on absences due to illness and injury in the work force. Its purpose is to provide an early warning system about health problems occurring among employees at participating sites. Data are collected by coordinators at each site and submitted to the Epidemiologic Data Surveillance Center, located at the Oak Ridge Institute for Science and Education, where quality control procedures and analyses are carried out. Rates of absences and rates of diagnoses associated with absences are analyzed by occupation and other relevant variables. They may be compared with the disease experience of different groups within the DOE work force and with populations that do not work for DOE to identify disease patterns or clusters that may be associated with work activities.

This annual report summarizes the 1993 morbidity data for the Idaho National Engineering Laboratory. The analyses focus on absences of 5 or more consecutive workdays oc-

curing among workers aged 18-78 years. The results are arranged in five sets of tables that present: 1) the distribution of the labor force by occupational category and pay status; 2) the absences per person, diagnoses per absence, and diagnosis rates for the whole work force; 3) diagnosis rates by type of disease or injury; 4) diagnosis rates by occupational category; and 5) relative risks for specific types of disease or injury by occupational category. Deaths occurring among active workers are listed separately; they are not included in any tables. All rates presented in this report are age-adjusted (see glossary) and represent the number of diagnoses reported per 1,000 persons in 1 year.

Throughout this report, the symbol "NA" means "not available" or "not applicable." An empty cell in a table indicates that the value of the cell is zero or that the value cannot be computed.

The tables show the results of analyses of diagnoses resulting from *absences*. An absence is defined as a period of 5 or more consecutive workdays away from work due to some health problem, such as an illness or injury. In tables presenting analyses of *diagnoses*, each diagnosis is counted because a diagnosis is for a specific illness or injury. A worker can have more than one di-

agnosis related to one absence from work. For example, a worker's single absence might involve both a back injury and pneumonia. Unlike analyses of absences, analyses of diagnoses focus on the rates of occurrence of specific types of disease and injury. Thus the worker with one absence in which he had a back injury and pneumonia would be counted twice in the analysis of diagnoses because two separate diagnoses are recorded for this one absence.

The data included in this report are supplemental to, but do not replace, those reported in other safety, industrial hygiene, and health physics reports prepared by DOE. There has been no attempt to validate diagnoses with medical records, pathology, or other laboratory reports. Also, there has been no attempt to validate occupational information reported by the site. For reporting purposes, occupational titles have been grouped into broad categories within which a great deal of diversity in tasks and exposures is likely to exist. Additional material outlining the methods used and explaining the diagnostic categories and frequently used terms can be found on the inside back cover.

Facility Overview

The Idaho National Engineering Laboratory (INEL) is located in two primary areas: a remote 890-square-mile desert site on the Snake River Plain and multiple locations in the city of Idaho Falls. Established in 1949 as the National Reactor Testing Station, INEL contains the largest concentration of nuclear reactors in the world. Over the years, 52 reactors have been built at INEL. While the majority were phased out after completion of their research mission, several are currently operating.

Contractors for DOE Idaho (DOE-ID) operate facilities at INEL, as well as administrative, scientific support, and nonnuclear research laboratories in Idaho Falls. Major contractors include EG&G Idaho, Westinghouse Idaho Nuclear Company, and B&W Idaho. In addition, Westinghouse Electric Corporation operates the Naval Reactors Facility; Argonne National Laboratory-West (ANL-W) operates an experimental breeder reactor and maintains research facilities; MK-Ferguson of Idaho Company provides construction management services; and Protection Technology Idaho provides security services.

Labor Force by Occupational Category, 1993

During 1993, there were 7,586 employees (aged 18-78) identified by Idaho National Engineering Laboratory as participants in epidemiologic surveillance. Seventy-three percent (5,516 workers) were men, and 27%

(2,070 workers) were women. Ninety-two percent (6,996 workers) were Caucasian, and the remaining 8% included African Americans, Asians, Hispanics, and Native Americans.

The composition of the work force by occupational category and salary status is given in Table 1. The occupational categories used in the table are based on the occupation and industry codes created by the Bureau of the Census in 1980. Because

workers can change occupational categories over the course of a year, workers were counted in the occupational category to which they were assigned on January 1, 1993.

Eighty-two percent of the workers were salaried, whereas 18% were hourly. The occupational categories with the largest number of employees were professional (37%), administration (26%), and technical (19%).

	Occupational Category	Number of Workers in 1993	Number of Workers in 1992	% Change from Last Year
Salaried	Administration	1,971	NA	NA
	Professional	2,769	NA	NA
	Technical	1,444	NA	NA
	Subtotal	6,184	NA	NA
Hourly	Service	423	NA	NA
	Craftsmen & Manual Laborers	664	NA	NA
	Nuclear	315	NA	NA
	Subtotal	1,402	NA	NA
	TOTAL	7,586	NA	NA

Table 1.
Labor Force by Occupational Category

Absences Among Work Force, 1993

Absences per Person. In 1993, 683 INEL employees reported an absence of 5 or more consecutive work days because of illness or injury. Eighty-three (12%) of these workers had two or more absences. A total of 779 absences were reported by the employees (Table 2.A).

Diagnoses per Absence. A total of 908 diagnoses were associated with the 779 absences of 5 or more days. Multiple diagnoses were reported for 108 (14%) absences (Table 2.B.)

Diagnosis Rates. In 1993, 908 diagnoses noted for absences of 5 or more consecutive work days yielded

an age-adjusted rate of 124.6 diagnoses per 1,000 persons. The diagnosis rate for women (168.6 per 1,000) was more than 50% higher than the rate for men (106.6 per 1,000) (Table 2.C).

Employee Category	Number of Workers	Number of Absences						Total Persons Absent at Least Once	Total Number of Absences
		0	1	2	3	4	5		
Male	5,516	5,093	375	41	6	1	0	423	479
Female	2,070	1,810	225	32	2	0	1	260	300
TOTAL	7,586	6,903	600	73	8	1	1	683	779

Table 2.A.
Absences per Person

Employee Category	Number of Diagnoses per Absence [†]					Total Number of Absences	Total Number of Diagnoses
	1	2	3	4	5		
Male	404	64	8	3	0	479	568
Female	267	28	4	0	1	300	340
TOTAL	671	92	12	3	1	779	908

Table 2.B.
Diagnoses per Absence

Employee Category	Number of Workers	Number of Diagnoses [†]	Crude Rate per 1,000	Age-Adjusted Rate per 1,000 [*]	Lower 95% Confidence Limit per 1,000	Upper 95% Confidence Limit per 1,000
Male	5,516	568	103.0	106.6	96.8	117.3
Female	2,070	340	164.3	168.6	149.1	190.7
TOTAL	7,586	908	119.7	124.6	115.7	134.2

Table 2.C.
Diagnosis Rate

[†] Includes all diagnoses reported with an absence of 5 or more days, including absences for pregnancy and delivery.

^{*} Standardized to age distribution of 1970 U.S. population.

Diseases and Injuries by Diagnostic Category, 1993

The age-adjusted diagnosis rate for each diagnostic category is given for all workers in Table 3. Because the patterns of diagnoses reported among men and women differ, Tables 4 and 5 show the diagnosis rates by gender to further describe the disease and injury patterns in the work force. Diagnoses associated with pregnancy, labor, and delivery are described in Table 6.

For all workers, the three diagnostic categories with the highest rates were diseases of the respiratory system (26.5 per 1,000), pregnancy and childbirth (22.3 per 1,000), and external causes of injury (19.9 per 1,000). Together, these three categories accounted for 44% of all diagnoses.

The diagnostic category with the highest rate among men was diseases of the respiratory system (22.4 per 1,000), with 123 diagnoses for 118 men. This category accounted for 22% of all diagnoses among men. Of these diagnoses, 39 were

related to upper respiratory disease, 58 to pneumonia/bronchitis, and 24 to chronic respiratory conditions. The category with the second highest rate, accounting for 20% of the total diagnoses, was external causes of injury (22.3 per 1,000), with 113 diagnoses reported for 106 men. Of these diagnoses, 27 were due to overexertion and strenuous movement, 23 were due to accidental falls, and 14 were due to transport accidents. Musculoskeletal disorders ranked third (15.7 per 1,000), with 85 diagnoses reported for 80 men. Twenty-nine of these were related to dorsopathies (spinal disorders). Additionally, 77 digestive system diagnoses were reported among 66 men. Forty-four percent of the digestive system diagnoses were due to hernias. Eighteen cancers were reported among 15 men in 1993: three men had skin cancer; three men had bladder cancer; two each had cancer of the tongue, prostate, and colon; and one each had cancer of the kidney, liver, and rectum.

The diagnostic category with the highest rate among women was diseases of the respiratory system (43.3 per 1,000), with 77 diagnoses reported among 73 women. Twenty-five of these diagnoses were related

to upper respiratory problems, 36 to pneumonia or bronchitis, and 15 to chronic respiratory conditions. The category with the second highest rate associated with absences was pregnancy and childbirth (22.3 per 1,000), with 47 diagnoses reported among 46 women. Musculoskeletal disorders (21.8 per 1,000) ranked a close third with 43 diagnoses reported by 38 women. Other less common diagnostic categories included genitourinary diseases (18.8 per 1,000), with 45 diagnoses reported for 34 women, and external causes of injury (16.7 per 1,000), with 35 diagnoses reported among 33 women. Of the injuries related to external causes, 13 were due to accidental falls and 8 were due to overexertion and strenuous movement. Seven cancers were reported among seven women: three breast cancers, three cancers of the genitourinary system, and one lymphoma (Hodgkin's disease).

Category of Diagnoses	ICD9-CM Code	Number of Diagnoses†	Age-Adjusted Rate per 1,000*	Lower 95% Confidence Limit per 1,000	Upper 95% Confidence Limit per 1,000
Infections and parasitic diseases	001-139	17	2.2	1.3	3.8
Malignant neoplasms	140-208, 230-234	25	4.0	2.6	6.1
• Digestive organs	150-159	4	0.8	0.3	2.4
• Respiratory system	160-165	0			
• Breast	174-175	3	0.5	0.1	1.8
• Genitourinary	179-185	5	0.6	0.2	1.4
• Nervous system	191-192	0			
• Leukemia, lymphoma	200-208	1	0.3	0.0	2.0
Benign neoplasms and other	210-229, 235-239	14	2.1	1.1	3.7
Endocrine and metabolic diseases	240-279	15	2.5	1.4	4.4
Blood and blood-forming organs	280-289	3	0.3	0.1	0.8
Mental disorders	290-319	25	2.9	1.9	4.5
• Alcoholism	303	7	0.9	0.4	2.2
• Drug abuse	304-305	1	0.1	0.0	0.6
Nervous system and sense organs	320-389	35	4.9	3.3	7.1
Circulatory system	390-459	39	5.4	3.8	7.6
• Hypertension	401	1	0.1	0.0	1.1
• Acute myocardial infarction	410	8	1.3	0.6	2.8
• Ischemic disease, not M.I.	411-414, 429.2	12	1.7	0.9	3.1
• Cerebrovascular disease	430-438	1	0.1	0.0	0.7
Respiratory system	460-519	200	26.5	22.6	31.0
• Upper respiratory	460-465, 470-478	64	7.8	5.9	10.2
• Pneumonia/bronchitis	466, 480-487	94	13.8	11.0	17.3
• Chronic respiratory conditions	490-496	39	4.7	3.3	6.6
Digestive system	520-579	101	12.9	10.4	16.1
• Hernias	550-553	36	4.9	3.4	7.0
• Gall bladder disease	574-575	14	2.0	1.1	3.6
Genitourinary system	580-629	73	10.1	7.7	13.1
• Benign prostatic hypertrophy	600	6	1.3	0.6	3.1
• Endometriosis	617	9	2.0	1.0	4.0
• Ovarian cysts	620.0-620.2	6	0.9	0.4	2.3
• Female genital pain/bleeding	625-626	11	0.9	0.5	1.7
Pregnancy and childbirth ¹	630-676	47	22.3	16.4	30.2
Skin and subcutaneous tissue	680-709	10	1.5	0.7	2.9
Musculoskeletal	710-739	128	16.9	13.9	20.5
• Dorsopathies system	720-724	49	5.7	4.2	7.8
Symptoms, signs, and ill-defined conditions	740-799	28	4.2	2.8	6.5
External causes of injury	E800-999	148	19.9	16.6	24.0
• Transport accidents	E800-849	19	3.0	1.8	5.1
• Medical accidents	E870-879	7	1.0	0.5	2.3
• Accidental falls	E880-888	36	4.5	3.1	6.4
• Accidents - struck by objects	E916-918	9	1.0	0.5	2.1
• Accidents - machinery	E919	2	0.4	0.1	1.8
Total minus pregnancies		861	116.2	107.7	125.3
TOTAL		908	124.6	115.7	134.2

Table 3.
Diseases and Injuries by Diagnostic Category - Males and Females

† Includes all diagnoses reported with an absence of 5 or more days.

* Standardized to age distribution of 1970 U.S. population.

¹ Only women age 18-45 years were included in the calculation of the rate for this diagnostic category.

Category of Diagnoses	ICD9-CM Code	Number of Diagnoses†	Age-Adjusted Rate per 1,000*	Lower 95% Confidence Limit per 1,000	Upper 95% Confidence Limit per 1,000
Infections and parasitic diseases	001-139	10	2.2	1.1	4.7
Malignant neoplasms	140-208, 230-234	18	3.7	2.3	6.0
• Digestive organs	150-159	4	1.0	0.4	2.9
• Respiratory system	160-165	0			
• Breast	174-175	0			
• Genitourinary	179-185	2	0.4	0.1	1.5
• Nervous system	191-192	0			
• Leukemia, lymphoma	200-208	0			
Benign neoplasms and other	210-229, 235-239	9	2.0	0.9	4.3
Endocrine and metabolic diseases	240-279	8	1.7	0.8	3.9
Blood and blood-forming organs	280-289	2	0.2	0.1	0.9
Mental disorders	290-319	17	2.8	1.6	4.7
• Alcoholism	303	6	1.0	0.4	2.5
• Drug abuse	304-305	1	0.1	0.0	0.8
Nervous system and sense organs	320-389	23	4.3	2.7	7.0
Circulatory system	390-459	33	5.9	4.1	8.5
• Hypertension	401	1	0.2	0.0	1.3
• Acute myocardial infarction	410	8	1.6	0.8	3.5
• Ischemic disease, not M.I.	411-414, 429.2	12	2.1	1.2	3.9
• Cerebrovascular disease	430-438	0			
Respiratory system	460-519	123	22.4	18.2	27.6
• Upper respiratory	460-465, 470-478	39	6.2	4.3	3.8
• Pneumonia/bronchitis	466, 480-487	58	12.3	9.0	16.6
• Chronic respiratory conditions	490-496	24	3.8	2.4	5.9
Digestive system	520-579	77	13.8	10.7	17.8
• Hernias	550-553	34	6.5	4.4	9.6
• Gall bladder disease	574-575	6	1.2	0.5	3.2
Genitourinary system	580-629	28	5.2	3.5	7.9
• Benign prostatic hypertrophy	600	6	1.6	0.7	3.8
• Endometriosis	617	NA	NA	NA	NA
• Ovarian cysts	620.0-620.2	NA	NA	NA	NA
• Female genital pain/bleeding	625-626	NA	NA	NA	NA
Pregnancy and childbirth	630-676	NA	NA	NA	NA
Skin and subcutaneous tissue	680-709	6	1.2	0.5	3.0
Musculoskeletal	710-739	85	15.7	12.2	20.1
• Dorsopathies system	720-724	29	5.1	3.3	7.8
Symptoms, signs, and ill-defined conditions	740-799	16	3.0	1.7	5.1
External causes of injury	E800-999	113	22.3	17.9	27.9
• Transport accidents	E800-849	14	3.5	1.9	6.4
• Medical accidents	E870-879	6	1.1	0.5	2.7
• Accidental falls	E880-888	23	4.0	2.5	6.4
• Accidents - struck by objects	E916-918	8	1.4	0.6	3.2
• Accidents - machinery	E919	1	0.1	0.0	0.8
TOTAL		568	106.6	96.3	117.3

Table 4.
Diseases and Injuries
by Diagnostic Category - Males

† Includes all diagnoses reported with an absence of 5 or more days.
* Standardized to age distribution of 1970 U.S. population.

Category of Diagnoses	ICD9-CM Code	Number of Diagnoses†	Age-Adjusted Rate per 1,000*	Lower 95% Confidence Limit per 1,000	Upper 95% Confidence Limit per 1,000
Infections and parasitic diseases	001-139	7	2.8	1.3	6.0
Malignant neoplasms	140-208, 230-234	7	4.0	1.6	10.4
• Digestive organs	150-159	0			
• Respiratory system	160-165	0			
• Breast	174-175	3	2.3	0.5	9.9
• Genitourinary	179-185	3	1.1	0.3	3.3
• Nervous system	191-192	0			
• Leukemia, lymphoma	200-208	1	0.6	0.1	4.6
Benign neoplasms and other	210-229, 235-239	5	2.6	1.0	6.5
Endocrine and metabolic diseases	240-279	7	3.8	1.8	8.2
Blood and blood-forming organs	280-289	1	0.4	0.1	2.7
Mental disorders	290-319	8	3.1	1.5	6.5
• Alcoholism	303	1	0.7	0.1	5.1
• Drug abuse	304-305	0			
Nervous system and sense organs	320-389	12	7.3	3.8	14.1
Circulatory system	390-459	6	2.5	1.1	5.8
• Hypertension	401	0			
• Acute myocardial infarction	410	0			
• Ischemic disease, not M.I.	411-414, 429.2	0			
• Cerebrovascular disease	430-438	1	0.4	0.1	2.7
Respiratory system	460-519	77	43.3	33.2	56.4
• Upper respiratory	460-465, 470-478	25	13.5	8.4	21.8
• Pneumonia/bronchitis	466, 480-487	36	21.7	14.8	31.7
• Chronic respiratory conditions	490-496	15	7.7	4.2	14.1
Digestive system	520-579	24	10.4	6.5	16.8
• Hernias	550-553	2	0.7	0.2	2.7
• Gall bladder disease	574-575	8	3.4	1.6	7.0
Genitourinary system	580-629	45	18.8	13.8	25.6
• Benign prostatic hypertrophy	600	NA	NA	NA	NA
• Endometriosis	617	9	4.9	2.5	9.7
• Ovarian cysts	620.0-620.2	6	2.7	1.2	6.3
• Female genital pain/bleeding	625-626	11	3.4	1.9	6.2
Pregnancy and childbirth ¹	630-676	47	22.3	16.4	30.2
Skin and subcutaneous tissue	680-709	4	2.2	0.8	6.1
Musculoskeletal	710-739	43	21.8	15.4	30.9
• Dorsopathies system	720-724	20	9.4	5.6	16.0
Symptoms, signs, and ill-defined conditions	740-799	12	6.8	3.5	13.3
External causes of injury	E800-999	35	16.7	11.2	25.0
• Transport accidents	E800-849	5	1.9	0.8	4.9
• Medical accidents	E870-879	1	0.7	0.1	5.1
• Accidental falls	E880-888	13	5.2	2.9	9.4
• Accidents - struck by objects	E916-918	1	0.3	0.0	2.1
• Accidents - machinery	E919	1	1.7	0.2	11.8
Total minus pregnancies		293	146.5	128.1	167.5
TOTAL		340	168.6	149.1	190.7

Table 5.
Diseases and Injuries by Diagnostic Category - Females

† Includes all diagnoses reported with an absence of 5 or more days.

* Standardized to age distribution of 1970 U.S. population.

¹ Only women age 18-45 years were included in the calculation of the rate for this diagnostic category.

Diagnoses Associated with Pregnancy, Labor, and Delivery

During 1993, 47 pregnancy-related diagnoses were reported among 46 women (Table 6). There were four diagnoses associated with pregnancy complications, two miscarriages, and 35 normal deliveries. In addition, there were three indications for care during pregnancy, labor, or delivery and three others due to complications of labor and delivery.

Diagnoses by Occupational Category, 1993

During 1993, the age-adjusted diagnosis rate for all employees was almost two times higher among hourly workers than salaried workers (198.4 versus 108.3 per 1,000 persons) (Table 7). Service workers, who comprised 6% of the work force, had the highest diagnosis rate (254.4 per 1,000), with 115 diagnoses reported for 46 persons.

Craftsmen and manual laborers had the second highest diagnosis rate (191.1 per 1,000), with 121 diagnoses reported among 96 persons. Nuclear workers ranked third, with 39 diagnoses reported for 29 workers (133.1 per 1,000). The category of professional workers had the lowest rate (86.3 per 1,000 workers).

Among men, the diagnosis rate for hourly workers (169.8 per 1,000) was almost double the rate for salaried workers (88.8 per 1,000) (Table 8). Service workers had the highest rate (210.0 per 1,000), with 69 diagnoses reported for 46 men. The second highest rate was among the craftsmen and manual laborers (176.7 per 1,000), with 108 diagnoses reported among 86 men. The nuclear workers ranked third, with 32 diagnoses reported among 23 men (111.8 per 1,000). As seen in Table 7, professional men had the lowest rate (76.7 per 1,000).

The diagnosis rate among women was more than two-and-a-half times higher for hourly workers (391.9 per 1,000) than for salaried workers (147.7 per 1,000) (Table 9). Craftsmen and manual laborers had the highest rate (561.3 per 1,000), with 13 diagnoses reported among 10 women. The second highest rate was among the service workers (397.5 per 1,000), with 46 diagnoses reported among 28 women. Nuclear workers ranked third, with seven diagnoses reported among six women (371.5 per 1,000). Professional and technical workers tied for the lowest rate (190.6 and 191.1 per 1,000). Women had higher diagnosis rates than men; this suggests a greater tendency among women to report injury or illness.

Category of Diagnoses	ICD9-CM Code	Number of Diagnoses†	Age-Adjusted Rate per 1,000*	Lower 95% Confidence Limit per 1,000	Upper 95% Confidence Limit per 1,000
Ectopic and Molar Pregnancy/Abortive Outcome	630-639	2	0.8	0.2	3.6
Complications of Pregnancy	640-648	4	1.9	0.7	5.4
Normal Delivery	650	35	17.4	12.3	24.7
Other Indications for Care in Pregnancy, Labor, and Delivery‡	651-659	3	0.9	0.3	2.8
Complications of Labor and Delivery	660-676	3	1.2	0.4	4.2
TOTAL		47	22.3	16.4	30.2

Table 6.
Diagnoses Associated with Pregnancy, Labor, and Delivery

†Includes all diagnoses with an absence of 5 or more days.

*Only women age 18-45 years were included in the calculation of the rates for these diagnostic categories.

‡Includes delivery by cesarian section and multiple births.

	Occupational Category	Number of Workers	Number of Diagnoses†	Age-Adjusted Rate per 1,000*	Lower 95% Confidence Limit per 1,000	Upper 95% Confidence Limit per 1,000
Salaried	Administration	1,971	217	113.4	97.7	131.7
	Professional	2,769	235	86.3	74.7	99.6
	Technical	1,444	181	129.0	108.6	153.3
	Subtotal	6,184	633	108.3	99.0	118.4
Hourly	Service	423	115	254.4	208.5	310.3
	Craftsmen and Manual Laborers	664	121	191.1	155.6	234.8
	Nuclear	315	39	133.1	91.3	194.0
	Subtotal	1,402	275	198.4	173.8	226.4
TOTAL	7,586	908	124.6	115.7	134.2	

Table 7.
Diagnoses by Occupational Categories - Males and Females

	Occupational Category	Number of Workers	Number of Diagnoses	Age-Adjusted Rate per 1,000*	Lower 95% Confidence Limit per 1,000	Upper 95% Confidence Limit per 1,000
Salaried	Administration	789	60	90.1	63.6	127.6
	Professional	2,383	180	76.7	64.9	90.7
	Technical	1,113	119	106.6	85.9	132.4
	Subtotal	4,285	359	88.8	78.6	100.4
Hourly	Service	311	69	210.0	161.6	272.7
	Craftsmen and Manual Laborers	636	108	176.7	141.9	220.0
	Nuclear	284	32	111.8	73.7	169.7
	Subtotal	1,231	209	169.8	145.8	197.7
TOTAL	5,516	568	106.6	96.8	117.3	

Table 8.
Diagnoses by Occupational Categories - Males

	Occupational Category	Number of Workers	Number of Diagnoses†	Age-Adjusted Rate per 1,000*	Lower 95% Confidence Limit per 1,000	Upper 95% Confidence Limit per 1,000
Salaried	Administration	1,182	157	135.1	113.0	161.5
	Professional	386	55	190.6	113.2	321.0
	Technical	331	62	191.1	144.3	253.0
	Subtotal	1,899	274	147.7	128.3	170.2
Hourly	Service	112	46	397.5	289.3	546.3
	Craftsmen and Manual Laborers	28	13	561.3	252.2	1,249.3
	Nuclear	31	7	371.5	155.4	888.1
	Subtotal	171	66	391.9	302.2	508.4
TOTAL	2,070	340	168.6	149.1	190.7	

Table 9.
Diagnoses by Occupational Categories - Females

†Includes all diagnoses reported with an absence of 5 or more days, including absences for pregnancy and delivery.
*Standardized to age distribution of 1970 U.S. population.

Relative Risk for All Diseases and Injuries by Occupation

In Table 10, the risk of one or more absences associated with all diagnoses for specific occupational categories is compared with all other occupational categories in the INEL work force. This comparison also takes into account the possible confounding effects of age and gender. In contrast to the previous series of tables, these analyses examine the risk of a worker having *one or more* absences for 5 or more consecutive workdays during 1993. This was done to minimize the problem associated with one person having multiple absences for the same condition.

The statistical methods used to compare the incidence of absences are the relative risk (RR) and the 95% confidence interval. The relative risk is the rate of absence in one group divided by the rate in a reference (comparison) group.

The reference group is all workers other than the occupational category of primary interest. A relative risk of 1.0 indicates that both groups have the same risk of absence. A relative risk *greater than 1.0* indicates that workers in a selected occupational category have a higher risk of absence than workers in all other occupational categories combined. A relative risk *less than 1.0* implies that the selected occupational group has a lower risk of absence compared with all other occupational categories combined.

The confidence interval is a statistical measure of the precision of the risk estimate. A 95% confidence interval indicates the range in which one would expect the relative risk to fall 95% of the time. If the confidence interval includes the value 1.0, then the rate of absence is likely to have occurred by chance; in other words, the relative risk is not statistically significant at the 95% confidence level.

For example, a relative risk of 2.0 with a confidence interval of 0.9 to 2.1 would not be considered statistically significant, whereas a relative risk of 1.4 with a confidence interval of 1.2 to 1.7 would be considered statistically significant. The width of the confidence interval indicates the amount of uncertainty in the risk estimate and is affected by sample size and the number of events in the diagnostic category.

Service workers (RR=2.0) and craftsmen and manual laborers (RR=2.0) had a statistically significant, increased risk of being absent 5 or more consecutive work days in 1993 due to disease or injury. Administration (RR=0.7) and professional (RR=0.6) workers had a statistically significant, decreased risk of being absent.

Occupational Category	Person-Years	Persons with at Least One Event*	Relative Risk**	Lower 95% Confidence Limit	Upper 95% Confidence Limit
Administration	1,971	177	0.7	0.6	0.9
Professional	2,769	167	0.6	0.5	0.7
Technical	1,444	140	1.2	1.0	1.4
Service	423	74	2.0	1.6	2.6
Craftsmen and Manual Laborers	664	96	2.0	1.6	2.6
Nuclear	315	29	1.2	0.8	1.8
TOTAL	7,586	683			

Table 10.
All Diseases and Injuries by Occupational Categories

* Persons with multiple absences during the time period were counted only once.

** Adjusted for age and gender – compared with all occupational categories.

Relative Risk for Selected Disease and Injury Categories by Occupation

Tables 11.A through 11.M present the relative risk of the absences of 5 or more consecutive workdays for selected disease categories among workers by each occupational category. Examination of tables 11.A through 11.M shows that service workers were significantly more likely to be absent at least once during 1993 for diseases of the respiratory system (RR=2.4); diseases of the digestive system (RR=2.6); diseases of the musculoskeletal system (RR=2.2); symptoms, signs, and ill-defined conditions (RR=4.5); and external causes of injury (RR=2.4).

Craftsmen and manual laborers were significantly more likely to be absent at least once during 1993 for infections and parasitic diseases (RR=3.9), diseases of the respiratory system (RR=2.9), diseases of the musculoskeletal system (RR=2.9), and external causes of injury (RR=2.2). Nuclear workers were

found to have a statistically significant, elevated risk associated with endocrine and metabolic disorders (RR=5.0).

The lower overall diagnosis rates observed among professional workers were also apparent in the relative risk analyses.

Significant decreases in risk among workers in administrative positions were observed for diseases of the respiratory system (RR=0.5) and symptoms, signs, and ill-defined conditions (RR=0.3). Professional workers were significantly less likely to be absent at least once during 1993 for infections and parasitic diseases (RR=0.1), diseases of the respiratory system (RR=0.5), diseases of the digestive system (RR=0.6), diseases of the musculoskeletal system (RR=0.4), and external causes of injury (RR=0.4).

The reasons for the large differences in overall diagnosis rates and relative risks for particular diagnostic categories among different occupational categories may be due to small numbers. However, the consistency of the differences across broad diagnostic categories suggests that compliance with reporting back to work through an occupational physician varies among occupational categories.

Deaths Among Active Employees, 1993

During 1993, no deaths were reported among active employees.

Occupational Category	Person-Years	Persons with at Least One Event*	Relative Risk**	Lower 95% Confidence Limit	Upper 95% Confidence Limit
Administration	1,971	6	1.2	0.4	3.8
Professional	2,769	1	0.1	0.0	0.9
Technical	1,444	4	1.3	0.4	4.0
Service	423	2	2.2	0.5	9.1
Craftsmen and Manual Laborers	664	4	3.9	1.3	12.2
Nuclear	315	0			
TOTAL	7,586	17			

Table 11.A.
Infections and Parasitic Diseases

Occupational Category	Person-Years	Persons with at Least One Event*	Relative Risk**	Lower 95% Confidence Limit	Upper 95% Confidence Limit
Administration	1,971	7	1.2	0.5	2.8
Professional	2,769	10	1.3	0.6	3.0
Technical	1,444	3	0.8	0.2	3.0
Service	423	1	0.7	0.1	5.2
Craftsmen and Manual Laborers	664	1	0.6	0.1	4.2
Nuclear	315	0			
TOTAL	7,586	22			

Table 11.B.
Malignant Neoplasms

Occupational Category	Person-Years	Persons with at Least One Event*	Relative Risk**	Lower 95% Confidence Limit	Upper 95% Confidence Limit
Administration	1,971	4	0.8	0.1	4.3
Professional	2,769	4	0.9	0.2	3.4
Technical	1,444	2	1.0	0.2	4.4
Service	423	1	1.2	0.2	9.8
Craftsmen and Manual Laborers	664	2	2.4	0.5	11.5
Nuclear	315	0			
TOTAL	7,586	13			

Table 11.C.
Benign Neoplasms

Occupational Category	Person-Years	Persons with at Least One Event*	Relative Risk**	Lower 95% Confidence Limit	Upper 95% Confidence Limit
Administration	1,971	5	0.8	0.2	3.0
Professional	2,769	4	0.7	0.2	2.9
Technical	1,444	2	0.8	0.2	3.7
Service	423	1	1.2	0.2	8.7
Craftsmen and Manual Laborers	664	1	1.0	0.2	6.5
Nuclear	315	2	5.0	1.1	21.8
TOTAL	7,586	15			

Table 11.D.
Endocrine and Metabolic Diseases

* Persons with multiple absences during the time period were counted only once.
** Adjusted for age and gender – compared with all occupational categories.

Occupational Category	Person-Years	Persons with at Least One Event*	Relative Risk**	Lower 95% Confidence Limit	Upper 95% Confidence Limit
Administration	1,971	7	1.2	0.4	3.1
Professional	2,769	9	1.1	0.5	2.6
Technical	1,444	5	1.3	0.5	3.5
Service	423	1	0.8	0.1	5.7
Craftsmen and Manual Laborers	664	0			
Nuclear	315	1	1.2	0.2	9.5
TOTAL	7,586	23			

Table 11.E.
Mental Disorders

Occupational Category	Person-Years	Persons with at Least One Event*	Relative Risk**	Lower 95% Confidence Limit	Upper 95% Confidence Limit
Administration	1,971	9	0.8	0.3	1.8
Professional	2,769	10	0.8	0.4	1.7
Technical	1,444	7	1.2	0.5	2.9
Service	423	5	2.5	1.0	6.4
Craftsmen and Manual Laborers	664	2	0.7	0.2	3.1
Nuclear	315	1	0.8	0.1	5.7
TOTAL	7,586	34			

Table 11.F.
Diseases of the Nervous System and Sense Organs

Occupational Category	Person-Years	Persons with at Least One Event*	Relative Risk**	Lower 95% Confidence Limit	Upper 95% Confidence Limit
Administration	1,971	4	0.5	0.2	1.4
Professional	2,769	15	1.5	0.7	3.3
Technical	1,444	3	0.6	0.2	1.9
Service	423	2	1.2	0.3	4.9
Craftsmen and Manual Laborers	664	5	1.9	0.7	5.2
Nuclear	315	1	1.0	0.1	7.6
TOTAL	7,586	30			

Table 11.G.
Diseases of the Circulatory System

Occupational Category	Person-Years	Persons with at Least One Event*	Relative Risk**	Lower 95% Confidence Limit	Upper 95% Confidence Limit
Administration	1,971	37	0.5	0.3	0.7
Professional	2,769	42	0.5	0.4	0.8
Technical	1,444	44	1.3	0.9	1.9
Service	423	26	2.4	1.6	3.6
Craftsmen and Manual Laborers	664	35	2.9	2.0	4.2
Nuclear	315	7	1.0	0.5	2.1
TOTAL	7,586	191			

Table 11.H.
Diseases of the Respiratory System

* Persons with multiple absences during the time period were counted only once.
** Adjusted for age and gender – compared with all occupational categories.

Occupational Category	Person-Years	Persons with at Least One Event*	Relative Risk**	Lower 95% Confidence Limit	Upper 95% Confidence Limit
Administration	1,971	21	0.9	0.5	1.5
Professional	2,769	24	0.6	0.4	0.9
Technical	1,444	19	1.2	0.7	2.0
Service	423	12	2.6	1.4	4.8
Craftsmen and Manual Laborers	664	6	0.8	0.3	1.7
Nuclear	315	7	2.1	1.0	4.7
TOTAL	7,586	89			

Table 11.I.
Diseases of the Digestive System

Occupational Category	Person-Years	Persons with at Least One Event*	Relative Risk**	Lower 95% Confidence Limit	Upper 95% Confidence Limit
Administration	1,971	20	0.8	0.4	1.4
Professional	2,769	15	0.7	0.4	1.4
Technical	1,444	13	1.4	0.8	2.7
Service	423	6	2.2	0.9	5.1
Craftsmen and Manual Laborers	664	4	1.2	0.4	3.3
Nuclear	315	1	0.6	0.1	4.7
TOTAL	7,586	59			

Table 11.J.
Diseases of the Genitourinary System

Occupational Category	Person-Years	Persons with at Least One Event*	Relative Risk**	Lower 95% Confidence Limit	Upper 95% Confidence Limit
Administration	1,971	30	0.8	0.5	1.3
Professional	2,769	23	0.4	0.3	0.7
Technical	1,444	20	0.9	0.6	1.5
Service	423	14	2.2	1.3	3.9
Craftsmen and Manual Laborers	664	23	2.9	1.8	4.7
Nuclear	315	8	1.9	0.9	3.9
TOTAL	7,586	118			

Table 11.K.
Diseases of the Musculoskeletal System

Occupational Category	Person-Years	Persons with at Least One Event*	Relative Risk**	Lower 95% Confidence Limit	Upper 95% Confidence Limit
Administration	1,971	4	0.3	0.1	0.9
Professional	2,769	6	0.5	0.2	1.4
Technical	1,444	7	1.7	0.7	4.1
Service	423	6	4.5	1.8	11.1
Craftsmen and Manual Laborers	664	4	2.5	0.8	8.0
Nuclear	315	0			
TOTAL	7,586	27			

Table 11.L.
Symptoms, Signs, and Ill-Defined Conditions

* Persons with multiple absences during the time period were counted only once.
** Adjusted for age and gender – compared with all occupational categories.

Occupational Category	Person-Years	Persons with at Least One Event*	Relative Risk**	Lower 95% Confidence Limit	Upper 95% Confidence Limit
Administration	1,971	26	0.7	0.4	1.1
Professional	2,769	29	0.4	0.3	0.7
Technical	1,444	35	1.4	0.9	2.0
Service	423	17	2.4	1.4	3.9
Craftsmen and Manual Laborers	664	25	2.2	1.4	3.5
Nuclear	315	7	1.2	0.5	2.5
TOTAL	7,586	139			

*Table 11.M.
External Causes
of Injury*

* Persons with multiple absences during the time period were counted only once.

** Adjusted for age and gender – compared with all occupational categories.

DIAGNOSTIC CATEGORIES

Category of Diagnoses	ICD-9-CM Code	Types of Illness in Category
All conditions	001-V82	All reported health events.
Infectious and parasitic diseases	001-139	Diseases caused by bacteria, viruses, and parasites.
Malignant neoplasms	140-208, 230-234	All cancers, regardless of the part of the body affected.
Benign neoplasms and neoplasms of uncertain behavior and unspecified nature	210-229, 235-239	Tumors that are not cancerous or that do not exhibit clearly malignant behavior, regardless of the part of the body affected.
Endocrine, nutritional and metabolic diseases, and disorders of the immune system	240-279	Diseases and conditions affecting the hormone secreting glands and organs; nutritional disorders, such as vitamin deficiency; metabolic diseases, such as diabetes and gout; and problems affecting the antibody producing system.
Diseases of the blood and blood-forming organs	280-289	Includes anemia and hemophilia, but excludes leukemia.
Mental disorders	290-319	Psychiatric diagnoses, such as dementia, schizophrenia, depression, and anxiety disorders; alcoholism; drug dependence; and eating disorders, such as bulimia.
Diseases of the nervous system and sense organs	320-389	Diseases affecting the brain, spinal cord, and peripheral nerves. Examples include meningitis; encephalitis; hereditary diseases, such as Huntington's chorea; Alzheimer's and Parkinson's disease; epilepsy; multiple sclerosis; migraine; diseases of the eye, such as cataract and glaucoma; and diseases of the ear, such as conductive hearing loss and otitis.
Diseases of the circulatory system	390-459	Diseases involving the heart, arteries, veins, and lymphatic system. Examples include rheumatic fever, heart murmurs, heart attacks, angina, hardening of the arteries, varicose veins, hemorrhoids, and phlebitis.
Diseases of the respiratory system	460-519	Includes colds, sinusitis, laryngitis, pneumonia and influenza, chronic bronchitis, asthma, and emphysema.
Diseases of the digestive system	520-579	Diseases affecting the teeth and mouth, salivary glands, digestive tract, and the abdominal cavity. Examples include dental abscess, ulcers, appendicitis, hepatitis (excluding viral hepatitis), cirrhosis of the liver, gallstones, pancreatitis, abdominal hernia, and intestinal polyps.
Diseases of the genitourinary system	580-629	Diseases affecting the kidneys, the prostate and testes; benign breast diseases; infertility (male and female); pelvic inflammatory disease; diseases of the ovary; and menstrual disorders.
Complications of pregnancy, childbirth, and puerperium	630-676	Includes miscarriage; complications of pregnancy, such as hemorrhage; pregnancy-related high blood pressure; pre-eclampsia; premature labor or other complications of labor.
Diseases of the skin and subcutaneous tissue	680-709	Includes acne, cellulitis, sunburn, psoriasis, and seborrhea.
Diseases of the musculoskeletal system and connective tissue	710-739	Includes arthritis, systemic lupus erythematosus, ankylosing spondylitis, herniated intervertebral disc ("slipped disc"), lumbago, sciatica, rheumatism, tendinitis, and osteoporosis.
Congenital anomalies	740-759	Abnormal anatomical development present at birth. Includes spina bifida, cleft palate, harelip, and various chromosomal anomalies, such as Klinefelter's syndrome.
Certain conditions originating in the perinatal period	760-779	Conditions or diseases of the mother that can produce perinatal illness or death of the fetus or newborn. Examples include maternal high blood pressure, maternal malnutrition, ectopic pregnancy, and breech birth. Also includes other conditions originating in the perinatal period, such as fetal malnutrition or slow growth, injuries related to birth trauma, and perinatal jaundice.
Symptoms, signs, and ill-defined conditions	780-799	Symptoms, signs, abnormal results of laboratory or other tests, and conditions for which no specific diagnosis has been made. Examples include blackout, chills, dizziness, fatigue, pallor, abnormal weight loss, undiagnosed chest pain, and heartburn.
Injury and poisoning	800-999	Dislocation of joints; sprains and strains of joints and associated muscles; concussions; bruises; cuts; internal injuries due to crushing, puncture, tearing, or blunt impact; burns; blisters; poisoning; frostbite; heat stroke; and complications of medical or surgical care.
Fractures, all sites	800-829	Cracks or breaks of any bone.
Dislocations	830-839	Separation of a bone from its normal socket or joint.
Sprains and strains of joints and adjacent muscles	840-848	Sprains include injuries to muscle from overexertion or from stretching the muscle beyond its normal limit. Sprains include injuries involving tearing or overextending the ligaments of a joint.
Intracranial injuries excluding those with skull fractures	850-854	Includes concussions, internal bruises, and hemorrhages within the skull without a fracture of the bones of the skull.
Internal injuries of the chest, abdomen, and pelvis	860-869	Includes internal injuries to the chest, abdomen, and pelvis and the organs within these areas of the body that do not involve an open wound.
Open wounds	870-897	Includes animal bites, cuts, lacerations, punctures, and amputations, excluding the arteries and veins.
Other injuries and effects of external causes	900-999	Miscellaneous injuries, including injuries to the arteries and veins, problems that occur an extended period of time after the injury has taken place ("late effects"), superficial bruises and abrasions, burns, post-injury shock, poisoning, toxic side effects of chemicals, heat stroke, electrocution, and altitude sickness.
Motor vehicle traffic accidents	E810-E819	Includes accidents involving motor vehicles alone or with other motor vehicles, pedestrians, or vehicles operated by pedals.
Other accidents	E916-E928	Includes accidents involving falling objects or machinery; accidents related to explosions; and those related to electrical current, radiation, hot or corrosive substances, noise, and overexertion.
Supplementary classifications related to personal or family history of disease	V10-V19	Covers situations in which the person is not ill or injured but has a personal or family history of problems, such as cancer, mental illness, allergies, or arthritis, that may affect his or her risk of illness.
Supplementary classifications related to health care for reproduction and child development	V20-V28	Includes problems related to pregnancy, postpartum care, contraception, outcome of delivery, and physical development of child.
Contact with health services for reasons other than illness or injury	V50-V59	Includes care for workers who have been treated previously for an illness or injury that is no longer present but who receive care to complete treatment or prevent recurrence.

Adjustment - A mathematical procedure for rates in which the effects of differences (such as age) in groups have been removed. The purpose of adjustment is to allow comparisons between two or more groups.

Epidemiologic Surveillance - The regular and systematic collection of data and interpretation of the distribution of illness, injury, and death in the DOE labor force over time.

ICD-9-CM - The ICD-9-CM (International Classification of Diseases-9th Revision-Clinical Modification) is based on the ICD-9 originally published by the World Health Organization and widely accepted as a standard for the coding of cause of death. The ICD-9-CM is required for the reporting of morbidity to all U.S. Public Health Service programs.

Diagnoses Rate - The number of new, reported health events observed among DOE workers per thousand DOE workers at risk during a given period of time.

The age-adjusted rate was calculated using the 1970 U.S. population. The age-adjusted rate represents the hypothetical rate that would have been observed if the 1993 group had the same age distribution as the 1970 U.S. population. The age-adjusted rate is used to compare populations that differ in age. The 1970 U.S. population was selected because it is the standard most used for published morbidity data.

The illness and injury absence rate is defined as an absence due to illness or injury of 5 or more consecutive work days, divided by the total number of workers. OSHA-recordable events may or may not involve an absence from work.

The 95% confidence interval is based on the normal approximation to the binomial distribution where the calculated illness and injury absence rate falls within the interval. The true rate lies within this interval 95% of the time.